CELLULAR A-BAND INTERFERENCE

Submitted by the

Communications Division

of the

Orange County Sheriff's Department

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Overview

The Communications Division of the Orange County Sheriff's Department (OCSD/Communications) operates and maintains a Motorola SmartZone 800 MHz radio system using Astro digital and analog modulation. The system provides communications to one hundred twenty-five law enforcement, fire, lifeguard and public works agencies for the County and its thirty-four incorporated Cities. The system is divided into six simulcasting cells using sixty-five 800 MHz frequencies, both 806 and 821 MHz. The frequencies are distributed across twenty-four remote radio facilities intended to provide "in-building" radio coverage over approximately 800 square miles.

Cellular Presence

There are approximately 450 cellular facilities operating at 800 MHz in Orange County. These sites are almost evenly divided between NEXTEL, AT&T Wireless (A-Band) and Verizon Wireless (B-Band). AT&T and NEXTEL use TDMA while Verizon uses CDMA. There are at least two other non-800 MHz providers operating within the County.

Cellular A-Band Interference

Handheld and mobile radio communications on the Orange County system suffer A-band degradation every day. Based on sample tests, OCSD/Communications believes that at least one sector of all one hundred and fifty A-band facilities cause interference out to a radial distance of 100 feet. At least twenty-five facilities cause interference beyond 100 feet and several facilities have been observed to cause problems beyond a quarter of a mile.

The interference causes partial or complete loss of reception to the handheld or mobile users near the cellular facility. This occurs mostly to units operating in the 821 MHz band but has been frequently observed in the 806 MHz band. The interference affects both handheld (Motorola XTS 3000) and mobile (Motorola Astro Spectra) radios with the greatest impact to the handhelds.

OCSD/Communications believes that the primary interference mechanism is intermodulation products generated in the front-end of the receiver. Cellular signal levels greater than –20 dBm (over 20,000 uV) have been recorded at vehicle roof heights at distance of 100 feet from the tower. Non-laboratory grade bench testing indicates receiver front-end overload problems to the XTS 3000 when signals levels exceed approximately –35 dBm.

Relative to other providers, OCSD/Communications receives minimal cooperation from AT&T Wireless, the local A-Band service.

Non-A-Band Interference

OCSD/Communications suffers from similar problems caused by NEXTEL radio facilities. These problems impact mostly the 806 MHz frequencies. NEXTEL has been extremely cooperative in resolving interference.

Interference from Verizon Wireless facilities is extremely rare. Isolated Verizon sites have been observed to cause problems when receivers are placed on the same horizontal plane with the transmitting antennas, such as on a parking structure. Verizon facilities are also known to compound problems when co-located with other 800 MHz providers. OCSD/Communications has a working relationship with Verizon, but has never had to test its interference mitigation responsiveness.